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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/437,607	11/10/1999	RUFUS L. CHANEY	1797.0090005	8216

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EXAMINER	
IBRAHIM, MEDINA AHMED	
ART UNIT	**PAPER NUMBER**
1638	

DATE MAILED: 10/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/437,607	CHANEY ET AL.	
	Examiner	Art Unit	
	Medina A. Ibrahim	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08/08/06*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,8-18,38-40,48,54,55,57,58 and 60-63* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4, 8-18, 38-40, 48, 54-55, 57-58, 60-63* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's response filed 08/08/06 in reply to the final Office action mailed 05/08/06 has been entered. However, upon further search and consideration, it has been determined that the finality of the rejection of the last Office action be withdrawn. The Office action contains NEW GROUNDS OF REJECTIONS and is made non-final. Any inconvenience the delay may have caused Applicant is deeply regretted.

Claims 1-4, 8-18, 38-40, 48, 54-55, 57-58, 60-63 are pending and are examined.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-4, 8-18, 38-40, 48, 54-55, 57-58, 60-63 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-11 of U.S. Patent No. 6, 786, 948. Although the conflicting claims are not identical, they

are not patentably distinct from each other because the invention in both cases are directed to the use of Alyssum species to remove nickel and other heavy metals from soil at soil pH of about 7.00. The claims of the instant application are directed to methods for removing/decontaminating nickel from soil comprising adjusting the soil pH to between 5.6 and 7.0 and cultivating a nickel hyperaccumulator in said soil. The claims of the issued patent encompass a method of recovering nickel from soil rich in nickel, comprising: (a) growing a nickel hyperaccumulating plant selected from the genera Alyssum on said soil, while maintaining soil conditions such that the concentration of calcium in said soil is from about 0.128 mM to about 5 mM and said pH is maintained below about 7.0, (b) allowing said growth to continue until such time as the concentration of Ni in the above ground tissues of said plant is over 1000 mg per kg gross dry weight of the above ground tissues, (c) drying said above ground tissues, and (d) recovering Ni from said above ground tissues. The soil pH of between 5.6 and 7.0 of the instant claims encompasses the soil pH of below about 7.0 of the issued patent. Therefore, it would have obvious to one of ordinary skill in the art to cultivate Alyssum plants in soils with soil pH of between 5.6 and 7.0 for nickel hyperaccumulation, given the hyperaccumulation potential of Alyssum species at soil pH of about below 7.0 as claimed in the issued patent.

Claim Rejections - 35 USC § 112

Claims 48, 57, 60-61 and 63 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method of selectively increasing the amount of Ni recovered from metal containing soil by adjusting the pH of the soil

from an initial pH to a raised pH of between 5.6 and 7.0, and cultivating in the soil a Ni-hyperaccumulator plant, does not reasonably provide enablement for the hyperaccumulation of other metals including cobalt and manganese by adjusting the soil pH from an initial pH to raised pH of between 5.6 and 7.0. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims. This rejection is repeated for the reasons of record as set forth in the last Office action of 05/08/06. In the response filed 08/08/06 Applicant has neither argued against the rejection nor has amended the claims. Therefore, the rejection is maintained.

The specification does not teach hyperaccumulation of cobalt or Manganese at soil pH of 5.6 to 7.0. Tables 1-3 of the specification show that the amount of Ni accumulated in the plant is higher when the soil is relatively high; while the amount of Co and Mn accumulated is relatively higher at lower soil pH. Therefore, one would not expect that adjusting the soil pH to between 5.0 and 7.0 would result hyperaccumulation of Co and Mn in plant tissues. In Table 1, the hyperaccumulator of Alyssum murale grown on soils with soil pH 6.0, for example, accumulated far greater amounts of nickel than the plants grown on soils of pH 4.5. In addition, plants taking up larger amounts of nickel at soil pH 6.0 accumulated smaller amounts of other metals such as cobalt and manganese. Similar results are also shown in Tables 2-4. Therefore, increasing the soil pH to at least 5.6 to 7.0 is not expected to recover 1000 mg/g of cobalt and 10,000 mg/g of manganese. Therefore, claims drawn to a method for accumulating by adjusting soil pH from an initial pH to an increased pH of at least 5.6 to

9.5 and cultivating Co or Mn-hyperaccumulating plants are not supported by an enabling disclosure. Applicant admits that all disclosures of the prior art are the opposite of what have been discovered in the instant specification. The prior art teaches that lowering soil pH to acidic level increases solubility and uptake of metals including Ni, Co, Mn, and Zn, thereby increasing recovery and accumulation of metals in plant tissues. Therefore, given the teaching of the specification which is limited to the use of Ni-hyperaccumulator plants at soil pH of at least 5.5-7.0 and increased recovery of nickel; and the state of the prior art which teaches exactly the opposite of Applicant's discovery, the amount of experimentation required to practice the invention as claimed is expected to exceed routine. In addition, it is clear that further research is required to understand this unusual effect of soil pH adjustment (from low pH to higher pH) on metal accumulation and recovery by metal hyperaccumulators. Therefore, the rejection is made and maintained.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 38-40 and 62 are rejected under 35 U.S.C. 102(b) as being anticipated by Homer et al (Plant and soil, 138:195-205 (1991)).

The claims are drawn to a method of decontaminating metal containing soil comprising cultivating at least one nickel hyperaccumulating in said soil, whereby the concentration of metal in the above ground plant tissues exceeds the concentration of metal in said soil by a factor of two, three, and four.

Homer et al teach a method of removing Ni and Co from metal contaminated soil comprising cultivating hyperaccumulator Alyssum species in said soil. At soil Ni content of 100 ug/g, the Ni concentration in the leaves of Alyssum troodii was more than 1000 ug/g; and at soil Ni of 1000 ug/g, the concentration of Ni in the leaves was about 10,000 ug/g (Figure 1). Also, the concentration of cobalt in the leaf tissues of A. troodi was 10 times the concentration of cobalt in the soil (see Fig. 2). Therefore, Homer et al teach all claim limitations.

Claims 38-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Brooks et al (Vegetation 45, 183-188 (1981), Applicant's IDS).

Brooks et al teach hyperaccumulation of Ni comprising growing Alyssum plant species on soil containing various amounts of Ni, wherein the *A.malacitanum* plants have accumulated up to 20,000 (2.0%) of Ni (dry wt) in the leaves (Table 1) from soils with Ni content of 1000 ug/g. Therefore, Brooks et al teach all claim limitations.

Claim 58 is rejected under 35 U.S.C. 102(b) as being anticipated by Brooks et al (Vegetation 45, 183-188 (1981), Applicant's IDS) in light of Baker and Brooks (Biorecovery 1, pp. 81-126 (1989)).

Baker et al teach hyperaccumultion of metals including Mn in *Thlaspi caerulescens* from metal contaminated soils and plants grown on a culture solution containing Mn. Baker et al also teach hyperaccumulation of Mn in shoots of *Thlaspi caerulescens* grown on a culture solution, wherein the concentration of Mn accumulated from the culture solution was much high the concentration of Mn in the culture solution and the concentration of Mn in plants from the metal contaminated soils. Accumulation of Mn in shoots of T. *caerulescens* reached 10,000 ug/g dry weights (see at least Table 3 and Figure 3). On page 62, paragraph bridging columns 1 and 2, Baker et al cite Baker and Brooks (1989) which teach Mn hyperaccumulators that accumulate Mn from soils. On page 99, Baker and Brooks (1989) report 3.2% (dry weights) of Mn accumulation in *Maytenus bureauvianus* growing on basic soil and 1.2% in *Alyxia rubricaulis* growing on acidic soil. Therefore, Baker et al teach all claim limitations.

Remarks

Claims 1-4, 8-18, 48, 54-55, 57, 60-61 and 63 are deemed free of the prior art in view of the declarations under Rule 1.132 of Yin-MING of 02/13/03 and 12/08/03.

No claim is allowed.

Contact information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Medina A. Ibrahim whose telephone number is (571) 272-0797. The Examiner can normally be reached Monday -Thursday from 8:00AM to 5:30PM and every other Friday from 9:00AM to 5:00 PM. Before and after final responses should be directed to fax nos. (703) 872-9306 and (703) 872-9307, respectively.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Anne Marie Grunberg, can be reached at (571) 272-0975.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

Mai
9/27/06

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